Goddard Procedural Requirements (GPR)

DIRECTIVE NO.	GPR 1410.2E	**APPROVED BY Signature:**	*Original Signed By*
EFFECTIVE DATE:	May 20, 2016	**NAME:**	David F. Mitchell
EXPIRATION DATE:	June 24, 2017	**TITLE:**	Director, Flight Projects

COMPLIANCE IS MANDATORY

Responsible Office: 403/Flight Programs and Projects Resources Office

Title: Configuration Management

PREFACE

P.1 PURPOSE

This directive establishes configuration control requirements for documents, data, and products that are subject to the Goddard Space Flight Center (GSFC) Management System (MS) as defined in GPR 1280.1.

P.2 APPLICABILITY

This directive applies to all GSFC organizations subject to the GSFC MS. It applies to the development of all products and processes within the scope of the MS.

This directive applies to controlled documents issued or revised after the effective date of this document, as well as to documents of external origin that are used or referenced in the conduct of work that is subject to the MS. The term "document" as used herein includes paper and electronic documents, engineering drawings, forms, and data. Directives as described in GPR 1410.1, and records as described in GPR 1440.8 that are not part of the MS, are exempt from these requirements.

Unless specifically called out in this directive, configuration management procedures issued or revised before the effective date of this document need not be updated to incorporate these changes.

P.3 AUTHORITY

NPD 1280.1, NASA Management System Policy

P.4 APPLICABLE DOCUMENTS AND FORMS

a. NPR 1441.1, NASA Records Retention Schedules
b. GPR 1280.1, The GSFC Quality Manual
c. GPR 1410.1, Directives Management
d. GPR 1440.8, Records management
e. GPR 8070.5, GSFC Technical Standards

f. GSFC-CM-001, GSFC Configuration Management Manual
g. GSFC Form 4-35, Configuration Change Request

P.5 CANCELLATION

GPR 1410.2D, Configuration Management

P.6 SAFETY

None

P.7 TRAINING

Code 400 shall provide training for configuration managers on the GSFC Configuration Management Manual and updates.

P.8 RECORDS

Record Title	Record Custodian	Retention
Completed Configuration Change Requests, including all supporting data such as review history, comments resolution, Configuration Control Board (CCB) recommendations, approval rationale, supporting documents and drawings, etc.	Performing Organization	*NRRS 8/107: for program/project records having operational value to the Agency throughout the program/project life. Temporary. Destroy/delete between 0 and 30 years after program/project termination

**NRRS 1441.1 – NASA Records Retention Schedules*

P.9 MEASUREMENT/VERIFICATION

Internal and external third party audit findings related to configuration management will be used to assess the effectiveness of these processes.

Project Managers having configuration items shall continually evaluate the effectiveness of their Configuration Management (CM) processes. They shall review CM status accounting reports with their configuration managers at least quarterly, analyzing for trends, recurring delays, excessive changes to specific systems, and other factors that will lead to process improvement.

Similarly, heads of organizations without configuration items shall review their document control processes at least quarterly with their document managers, with equivalent criteria and objectives.

PROCEDURES

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will," and descriptive material by "is."

1 GENERAL

1.1 Relationship to Other Documents

This GPR shall be the Center's top-level directive for document control, and addresses control of all types of controlled documents (see Appendix A) except directives. Directives are governed by GPR 1410.1 and are not subject to the requirements herein.

Details of GSFC's configuration management requirements and processes shall be documented in the GSFC Configuration Management Manual, GSFC-CM-001, which shall be available at https://fpdspi.gsfc.nasa.gov. Code 400 shall be responsible for the content and control of GSFC-CM-001.

The Center's drawing standards shall be documented by the Applied Engineering and Technology Directorate (AETD). These standards shall be used for all design drawings within the scope of this GPR.

1.2 Waivers

The Director of Flight Projects shall be the approving authority for waivers to the requirements of this directive.

2 CONFIGURATION MANAGEMENT OF CONFIGURATION DOCUMENTS

All organizations having Configuration Items (CIs) shall implement configuration management processes that comply with the requirements herein and in GSFC-CM-001. Additional requirements for configuration control of in-house products are discussed in Section 3.

2.1 Responsibilities

2.1.1 The Flight Projects Directorate shall be responsible for:

a. Maintaining GPR 1410.2 and its revisions,
b. Maintaining GSFC-CM-001 and its revisions, available at https://fpdspi.gsfc.nasa.gov.

2.1.2 The AETD shall be responsible for:

a. Preparing and maintaining GSFC design drawing standards.
b. Converting the GSFC drawing standards currently documented in 500-PG-8700.2.5 into a GSFC Technical Standard in accordance with GPR 8070.5.

2.1.3 Organization Heads of organizations having CIs shall:

a. Designate a configuration manager;
b. Appoint the chairperson of the CCB;
c. Appoint permanent and ad-hoc members to the CCB, as required;
d. Ensure that affected organizations participate in the issue/change process;
e. Provide customer notification and obtain the customer's approval, if customer requirements are affected. The customer shall be able to participate in any CCB action affecting the final deliverable product;
f. Ensure the effective management and flow of data through the CCB;
g. Ensure that document and data changes and product changes are verified in affected systems or elements thereof;
h. Ensure that records of the process are maintained, including identification of reviewers and approvers and their comments;
i. Define requirements for periodic configuration audits, to be conducted as required, to verify that configuration management processes of the organization and its suppliers are effective and meet specified requirements; and
j. Continually evaluate the effectiveness of the CM processes.

2.1.4 CCBs shall have the following responsibilities and authorities:

a. Formally evaluating, dispositioning, and documenting all actions on proposed new documents and changes;
b. Ensuring that thorough consideration is given to the impact of each proposed change to documents in terms of effect on product, its processing, and intended use; and
c. Ensuring that applicable Controlled Document Lists or equivalent control methods are current and maintained in sufficient detail to clearly identify the document number, title, revision status, effective date, expiration date, and document sponsor of every controlled document owned by the organization.

Only the contracting officer (CO) can formally issue contractually binding documents to the affected contract. The CCB chair is the authorizing individual that can authorize changes to controlled documents, but only the CO is authorized to issue the changes contractually.

2.2 Configuration Management Procedure Requirements

2.2.1 All organizations having configuration documents shall control them in accordance with approved configuration management procedures that address the organization's configuration control

processes. Control of configuration items shall be performed or managed by an appointed configuration manager.

The organization head shall define the review and approval process, e.g., CCB processes for CI documents, or an equivalent review for non-CI documents. The review team may range in size from a single individual for non-CI documents to a group that represents all affected personnel, organizations, or systems. The organization head is responsible for determining CCB or review team membership appropriate to meet the requirements herein.

2.2.2 Content of Configuration Management Procedures (CMPs)

All CMPs issued or revised after the effective date of this GPR shall address and describe the following configuration management processes, at a minimum:

a. Selection and identification of items that require configuration control, described by type (e.g., test plans and procedures, systems review plans, project plans, external documents, forms, etc.). The organization head may also designate other documents for configuration control.

b. Description of new release processes, change processes, and other configuration management methods used;

c. Configuration Control Board (CCB) membership, procedures, their change approval authority, and the process for elevating proposed changes to higher-level CCBs;

d. Descriptions of change priorities, including Emergency, Urgent, and Routine priorities, and their differences in CCR processing;

e. Review and approval processes, including identification of review responsibilities and/or CCBs;

f. Description of Controlled Documents List or equivalent control method that identifies, as a minimum, the document number, title, revision status, effective date, expiration date, name of responsible organization, and document sponsor;

g. Identification of persons, by positions, responsible for controlling documents and the Controlled Documents List(s) (or equivalent);

h. Identification (e.g., numbering system) conventions to be applied to configuration items and configuration documents;

i. Numbering and identification of revisions and change pages (see 2.3.5);

j. Description of the organization's process for initiating a new controlled document, or for requesting a change to a controlled document;

k. Handling of cancelled documents to ensure that:

(1) relevant versions of documents are available where needed;
(2) obsolete documents are marked as such and removed or protected against unintended use;
(3) document users are notified, when appropriate;

l. Configuration status accounting;

m. Configuration verification. This requires a clear and concise process for ensuring that approved configuration changes are properly and adequately implemented and verified before CCR closure;

n. Configuration management requirements for contractors, including the requirement for project approval of contractor CMPs;

o. Configuration audits of suppliers, both in-house and out-of-house;

p. Revalidation process (optional). If revalidation is used by an organization, it shall be described in the CMP (see 2.3.7.e); and

q. Special requirements for organizations building or integrating a product on site. These requirements are identified in Section 3.

2.2.3 Each Directorate performing work on CIs shall define the configuration management requirements for their directorate in a Directorate CMP that describes which organizations shall implement CM, who the approving authorities are for the CM procedures, and how records requirements are met. The procedure shall also specify the organizational levels (e.g., directorate, division, branch, project, etc.) at which configuration control procedures are required.

2.2.4 CMPs issued or revised by an organization after the effective date of this GPR shall be released as directives (Procedures and Guidelines, or PGs) and posted in the Goddard Directives Management System (GDMS).

2.2.5 Configuration control procedures shall be in place and approved not more than 60 days after approval of a new organization. For flight projects, procedures are required at least 60 days before approval of the new organization. Ideally, flight projects should have a CMP ready for use when needed during Phase A of the program/project life cycle.

2.3 Configuration Identification Requirements for Controlled Documents

The identification requirements below shall apply to all GSFC-produced controlled documents except drawings and engineering orders, which shall follow the GSFC Drawing Standards.

2.3.1 Draft documents shall be clearly marked as drafts on the front covers. Front covers of drafts shall have no indication of prior approvals, effective dates, or expiration dates.

2.3.2 Outdated or obsolete documents shall be marked as such and kept on file but shall be removed from points of issue or otherwise precluded from unintended use. Electronic listings shall show when documents are obsolete or canceled. Obsolete documents shall be retained, preferably electronically, but clearly marked to show that they are obsolete, superseded, or otherwise not suitable for use.

2.3.3 Controlled documents shall be retained and disposed of in compliance with NRRS 1441.1.

2.3.4 Controlled documents and associated records shall be legible and readily identifiable.

2.3.5 All document changes shall use one of the following conventions:

a. Released as a complete new revision, or

b. Changed by a combination of change pages and a list of effective pages. Change page sets shall be numbered consecutively, and change pages associated with an approved change shall indicate the change number and the number of the revision to which it applies. The CCB shall evaluate each change and determine whether the document will be issued as a new revision or a change to an existing revision.

The use of change pages and Lists of Effective Pages shall be described in the organization's CMP. A running history of all changes and revisions shall be maintained in the Change History Log, either by written summary or by citing the appropriate CCRs. Organizations may cite the appropriate CCRs if the CCRs are accessible online to users needing the information.

2.3.6 Document Identification. All controlled documents shall have clear document identification as described below.

2.3.6.1 Normal Requirements. The first page (cover page) of all controlled documents shall contain, as a minimum, the following information:

a. Unique document number;
b. Revision level of the correct version, with change numbers if applicable;
c. Document title;
d. Name and organization code of Responsible Organization;
e. Effective date. See also 2.3.7.b; and
f. A footer indicating where to confirm the proper revision status. Where practical, this footer should be repeated on every page. When a URL is provided, it should take a user to a main menu or entry point of an appropriate database or on-line CDL. Examples are

CHECK THE HST TECHNICAL MANAGEMENT INFORMATION SYSTEM (TMIS) AT
http://tmisx21.hst.nasa.gov/ TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

Or

CHECK THE CODE 400 MASTER DOCUMENT LIST PRIOR TO USE TO VERIFY THAT THIS IS THE CORRECT VERSION

2.3.6.2 Contractually Binding Documents

Contractually binding documents shall be identified, as a minimum, by their document number, title, and a version/revision indicator. The version/revision indicator shall indicate use of a specific version, or the latest version, as determined by the CCB. They should not have the above footer information or an expiration date.

Contracting officers shall ensure that proper and adequate identification information is provided.

2.3.7 Controlled documents shall expire no more than 5 years after the effective date. The following requirements shall apply:

a. The expiration date shall be tracked on the organization's MCDL;
b. The expiration date may be placed on the cover, at the organization's discretion;
c. The organization shall have a positive, documented process to ensure that documents not marked with an expiration date are unavailable for use after they expire;
d. Only the contracting officer can authorize a change to the expiration date on contractually binding documents; and
e. The organization may revalidate a controlled document by a documented review and approval process. If there are no changes, or changes are merely of an editorial nature, revalidation allows extending the expiration date for up to five years. The effective date is not changed. The revalidation shall be documented in the Change History Log.

2.4 Configuration Change Requests (CCRs)

Requests for new configuration document releases or changes to existing configuration documents shall be initiated using a CCR, or equivalent change request process, defined in the responsible organization's CMP. Change requests shall include, as a minimum, the following information:

a. Initiator name, organization code, and E-mail address;
b. Date submitted;
c. Title of document to be changed;
d. Document number of document to be changed;
e. Revision/change (letter and/or number) of document to be changed;
f. Description of action requested;
g. Reason for action requested;
h. Other documents affected, with explanation;
i. Disposition/approval/disapproval; and
j. Confirmation of proper implementation of the change, and closure.

A Configuration Change Request, GSFC Form 4-35, is available from the NASA Electronic Forms (NEF) Server, and meets all above requirements for configuration control. Organizations may tailor this form to their own requirements, use their own forms, or define an equivalent process (e.g., an on-line template) in their CMPs, but they shall include, as a minimum, all the information defined above.

The responsible organization shall process change requests in accordance with documented procedures. The CCB chairperson shall be the approving authority for CCRs. Disapproved change requests shall be closed or returned for correction and resubmittal. Approved change requests shall remain open until approved changes to the documentation have been incorporated and verified. The configuration manager shall inform the originator of the disposition.

2.5 External Documents

The latest versions of external documents are normally used.

When a GSFC organization needs to utilize a version that is different from the latest version, the version shall be identified on the organization's CDL. This use shall be approved as a configuration change, and processed in accordance with the organization's CMP.

3 IN-HOUSE PRODUCT CONFIGURATION MANAGEMENT

When an organization is building or integrating a product on-site, additional product-related requirements are needed. The following topics shall be addressed in their CM procedures, in addition to those described in Section 2.2.2:

a. The process of selecting and classifying hardware/software items that require configuration control (configuration items), described by type. This process shall include the criteria for determining such selection, and identification of decision-making authority for additions and exceptions;

b. Establishment and updating of configuration baselines;

c. Identification, documentation, and evaluation of change requests, including identification of change requests requiring customer approval and evaluation of the effect of changes on constituent parts and products already delivered;

d. Documentation of change approvals, including effectivity considerations. If "red-line" change approval capability is desired, associated documentation, authorities, and limitations shall be addressed;

e. Identification (e.g., numbering) conventions to be applied to configuration items;

f. Roles of CM with respect to Work Order Authorizations (WOAs) and attachments to WOAs, including use of CM release stamps and WOA red-lines;

g. Verification that changes have been implemented;

h. Configuration management processes and requirements for contractor/subcontractors and in-house suppliers. CM procedure requirements shall be added/included in GSFC Contracts where contractor design of a product within the scope of this directive is anticipated. Supplier CM procedures shall require approval by the organization; and

i. The Product Design Team shall ensure that design changes are controlled and documented in accordance with applicable configuration control procedures. Whenever the design fails to meet requirements, the Product Design Lead recommends and implements design changes in accordance with the applicable CMP.

4 DOCUMENT CONTROL FOR ORGANIZATIONS NOT HAVING CONFIGURATION ITEMS

Some organizations do not have configuration items, but are responsible for processes that may have an indirect effect on product. Examples of these processes are travel requirements, reorganization procedures, training procedures, financial management requirements, etc.

These organizations shall:

a. Document these processes;
b. Establish a written procedure for control of the organization's process documents. The procedure shall describe selection of processes to be documented, review, approval, release, and controls;
c. Appoint a document manager responsible for proper document control; and
d. Provide access to these documents, providing information similar to that on a CDL (section 2.2.2f).

5 CHANGE CONTROL PROCEDURES FOR GSFC-CM-001

Code 400 shall chair a Configuration Control Board for GSFC-CM-001. Standing members shall include, as a minimum, representative(s) from 200, 300, 400, 500, 600, 700, and 800.

Proposed changes shall be coordinated as follows:

a. The CCB Chair, through the Center Directives Manager, shall use Directorate Directives Managers (DDMs) to coordinate a Center-wide review of proposed changes/revisions by CM leads. DDMs shall collect comments and send them to the CCB Chair.

b. The CCB shall coordinate disposition of comments.

c. The CCB shall review all changes for approval by the CCB Chair. The CCB Chair shall be the Director of Flight Projects or designee, and shall have final approval authority.

d. Approved revisions shall be announced through the DDMs and posted at: https://fpdspi.gsfc.nasa.gov .

Appendix A – Definitions

a. Configuration Audit – An assessment of the effectiveness of an organization's configuration management processes, either internally or of its suppliers.

b. Configuration Baseline – The configuration of a product or service, formally established at a specific point in time, which serves as a reference for further activities.

c. Configuration Change Request (CCR) – A documented request to issue, change, or delete a controlled document. A generic CCR form (GSFC 4-35) meeting minimum requirements is available on the Goddard Directives Management System (GDMS). See Section 2.4.

d. Configuration Control – The element of Configuration Management concerning the systematic proposal, justification, evaluation, coordination, and disposition of approved baselines and changes, and the implementation of approved changes to baselined documentation and products (Configuration Items).

e. Configuration Control Board (CCB) – A board composed of designated individuals who review and recommend approval or disapproval of proposed baseline Configuration Items and changes, revisions, or cancellation.

f. Configuration Documents – Documents that define requirements, design, build/production, validation, and interfaces of products that are designated as configuration items.

g. Configuration Item – A designation applied to a product that has been determined to be subject to CM requirements. Products include hardware, software, processed materials, services (e.g., transportation or lifting operations), or any discrete portions thereof treated as a single entity in the configuration management process.

h. Configuration Management – A system for controlling and documenting changes to selected baseline documents, hardware and software. Configuration management systems contain the following elements:

(1) Identification of controlled documents and configuration items
(2) Configuration control
(3) Configuration status accounting
(4) Configuration verification

i. Controlled Document – A document that affects the quality of an organization's product. Controlled documents are those designated as requiring formal document control before they may be changed or released.

j. Controlled Documents List (CDL) – A list of an organization's controlled documents, serving the essential purpose of identifying the latest or correct version of all of the organization's controlled documents. An organization may have multiple CDLs, where a CDL is generated for a specific purpose, e.g., a listing of documents of a given system or subsystem. These shall be considered part of the organization's Master Controlled Documents List (MCDL), and may be incorporated into the MCDL. If the organization has only one CDL, that CDL is considered to be the MCDL.

k. Data – Electronic or written information.

l. Directive – A policy, procedure and guideline, or instruction that has been approved and published by the appropriate authority. GPR 1410.1 addresses five types of directives, each of which serves a specific purpose:

(1) Goddard Policy Directive (GPD) – A policy statement that describes what is required by GSFC management for achieving NASA's vision and mission.

(2) Goddard Procedural Requirements (GPR) – A statement of specific, detailed procedures for implementing NASA and Goddard policies.

(3) Goddard Interim Directive (GID) – A temporary directive used when there is an immediate need for a directive that implements Center requirements quickly, and can fulfill that need for up to 12 months until a GPD or GPR can be processed

(4) Procedures and Guidelines (PG) – A documented description of how a Goddard organization will perform its own activities.

(5) Work Instruction (WI) – A document developed by an individual or group that delineates detailed activities to be carried out by that individual or group to accomplish a specific task or set of closely related tasks.

m. Document Sponsor – An individual designated to be responsible for the content, changes, and records associated with a controlled document.

n. Effective date – The date the final approving authority signs/approves a document.

o. External Document – A document, such as a plan, specification, or standard, that comes from an external source and is implemented by an organization as part of the MS. Examples include military specifications and industry standards.

p. Formal Document Control – A process whereby changes to an approved document are properly identified, recorded, evaluated, approved or disapproved, incorporated, and verified as appropriate and necessary. A subset of this process is used for the initial release of the document.

q. Master Controlled Documents List (MCDL) – A consolidated listing of all documents controlled by the organization, required when the organization has multiple lower-level CDLs. All of the organization's CDLs are part of the MCDL.

r. NASA Electronic Forms (NEF) Server – The repository for Agency and Center forms.

s. Organization Head – The head of any organization needing to establish configuration management or document control procedures as described herein. Examples include project managers, project scientists, branch heads, Directors of, etc.

t. Product – Systems, hardware, software, data, documentation, services, and/or processed material resulting from work activities at GSFC that have been defined to be in-scope to the MS.

u. Responsible Organization – The organization responsible for maintaining the accuracy and currency of the document/data from baseline release through all follow-on actions.

v. Revalidation – A process of review and approval of an expiring document for the purpose of extending its expiration date.

Appendix B – Acronyms

AETD	Applied Engineering and Technology Directorate
CCB	Configuration Control Board
CCR	Configuration Change Request
CDL	Controlled Documents List
CI	Configuration Item
CM	Configuration Management
CMP	Configuration Management Procedure
CO	Contracting Officer
DDM	Directorate Directives Manager
GDMS	Goddard Directives Management System
GID	Goddard Interim Directive
GPD	Goddard Policy Directive
GPR	Goddard Procedural Requirements
GSFC	Goddard Space Flight Center
MCDL	Master Controlled Documents List
MS	Management System
NEF	NASA Electronic Forms Server
NPR	NASA Procedural Requirements
PG	Procedures and Guidelines
WOA	Work Order Authorization

CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	01/24/00	Initial release
A	10/08/02	• Changed responsible organization from 401 to 403. • Changed GPG template to conform to GPG 1410.1D, renumbering paragraphs accordingly. • Added Form 4-35 to P4. • Corrected record retention requirements in P8 • Changed all quality records references to "Records." • Clarified definitions of Controlled Documents, Effective Date, and Release Date. • In P1Changed 1.1 to make designation of a Configuration Manager mandatory and make organization head responsible for designating CCB members. • Updated 1.2.1 to apply to future releases of configuration management procedures. In 1.2.1.c, changed CCR priorities to Emergency, Urgent, and Routine • In 1.3, added retention requirements of NPG 1441.1, legibility requirements, and requirements for periodic review and updating of controlled documents. Changed 1.3.5 to add Effective Date and Expiration Date. • In 1.4, clarified processing requirements before closure. Added requirement to notify CCR originators of CCR disposition. • Rewrote 1.5 to address requirements for control of external documents. • Added requirement in 2.d for evaluation of the effect of changes on constituent parts and product already delivered.
B	03/10/03	• P.2 – corrected the first sentence to reflect that directives as described in GPG 1410.1 and records as described in GPG 1440.7 are that are NOT part of the GMS are exempt from this GPG.
C	03/01/05	Clarified all requirements to clearly distinguish them from supporting text in accordance with the NASA rules review. Changed Authority directive in P.3 to NPD 1280.1. Added metrics requirement. Modified 1.3.4 to simplify process for revalidating expired documents.

		Changed 1.4 to add alternate means of proposing new document releases or changes.
D	06/24/08	General rewrite as follows: • Change Quality Management System to the GSFC Management System throughout. • Incorporate all requirements of GID 1410.1. • Added new definitions in P.10.h, I, j, m, n, u, and for GIDs. • Renamed Configuration Change Requests throughout, eliminating earlier Configuration Change/Approval Requests and Configuration Change/Release Requests. • Clarified record requirements for CCRs. • Added requirements for controlled documents for functions that are not configuration controlled. • Added clarification to contractually binding documents in 2.1.4 and 2.3.7. • In 2.2.2, added additional items to be required in CM procedures. • Clarified requirements for directorate CM procedures and when procedures are required for new organizations. • Deleted expiration date requirement from front covers of controlled documents. • Added additional fields to Controlled Documents Lists, and added MCDLs. • Clarified requirement for review of supplier CM procedures. • Clarified role of Contracting Officers
	05/04/13	Administratively extended until June 24, 2014.
	06/26/14	Administratively extend for one year.
	06/24/15	Administratively extend for one year.
E	05/20/16	Administratively revised and extended for one year. • Updated to new template • Updated links • Removed references to CCMS • Corrected use of “configured item” to “configuration item” for internal consistency